Headquarters U. S. Air Force

Future Vectors

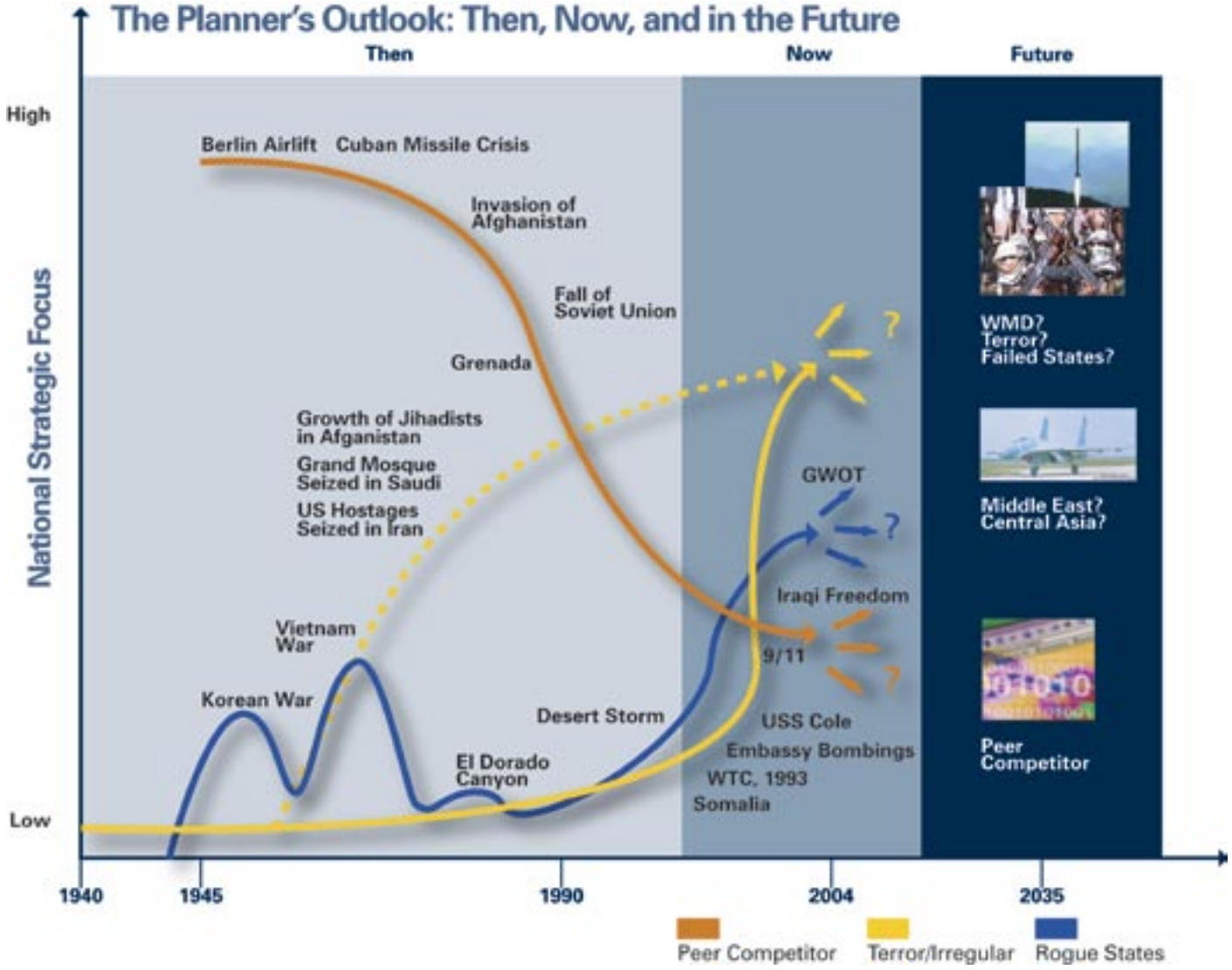
Assuring Joint Air & Space Dominance in the 21st Century

Shaping Tomorrow's Air and Space Power Today

Planners in the United States Air Force are grappling with a difficult question—what roles and missions will the Air Force perform in the emerging security environment? How these strategists answer this question today will shape the future of U.S. air and space power and the way the nation protects its interests for the next 20 years and beyond.

The magnitude, scope, and difficulty of this challenge are similar to the ones the United States faced prior to World War II. In 1938, Major General Henry (Hap) Arnold, a U.S. Army aviator and newly named chief of the Army Air Corps, was responsible for developing a military strategy for the next 20 years. He could not have predicted that the Army Air Corps would become the U.S. Air Force, that nuclear bombs would destroy two entire cities, or that the United States would defeat Japan and Germany in a world war that would claim 50 million lives. Likewise, Arnold could not have predicted that in twelve years, the United States would be fighting China on the Korean Peninsula or that in 25 years, they would wage an ultimately futile counter-insurgency in Vietnam.

The future holds enormous uncertainty. The security environment is unpredictable and will grow only more complex over time. Air Force planners will answer these challenges by shaping the Force to dominate the air, space, and cyber commons.



Planners' Outlook

Over the past 60 years, the world has undergone remarkable change. The figure above depicts not only our focus on known threats, but also on what was missed. While the Cold War and major theater wars animated much of our thinking and planning, strategists underestimated the rise of fundamentalism and terror—only to be shocked into awareness of this threat on 9/11.

Over the near term, the Global War on Terror clearly will be the major priority, but defense planners also must prepare for other long-term possibilities. Failed states with weapons of mass destruction, regional competitors, and even the emergence of a peer competitor are all possibilities. Looking to the future, the challenge is to not only fight and win the Global War on Terror, but also to position the country for success against a series of unpredictable, potentially simultaneous threats.

U.S. Air Force Capabilities

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In the joint and interagency environment, the Air Force possesses three core capabilities that provide the nation with a broad set of tools needed to manage complex, unexpected, and worldwide challenges.

Persistent C4ISR

An accurate picture of the battlespace is critical across all of the challenges. Roughly 30 percent of the Air Force budget is dedicated to the sensors that collect imagery, de-conflict air and space, listen to adversary communications, enable precision navigation, and develop actionable intelligence. Persistent C4ISR provides the "network" that binds together joint and interagency players.

Global Mobility

Global challenges demand global responses. Whether they're humanitarian, military, or, increasingly, a mix of both, the Air Force meets these demands with an airlift and tanker fleet with worldwide reach. This capability underwrites the range of joint expeditionary operations—from aerial refueling of Navy strike aircraft to extend their reach to targets; to direct delivery of relief supplies or joint forces from the continental United States on air-refueled airlifters; to the sustainment and tactical mobility of forward deployed ground forces.

Rapid Strike

Rapid Strike is the U.S. Air Force's ability to control air and space and then exploit that medium to deliver a precise, tailored effect anywhere on the planet. Precision weapons are the norm in today's Air Force, and allow the Air Force to achieve what would have taken hundreds of aircraft and thousands of munitions in the past.

These three capabilities, **combined with the Air Force people**—active, Guard, Reserve, civilians, and contractors—are the preconditions for success. They provide the joint force with the tools needed to succeed.


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Enabling the Joint Team

To help prepare for this increasingly complex strategic planning environment, the Office of the Secretary of Defense (OSD) has identified four persistent and emerging challenges.

Irregular challenges arise from the adoption or employment of unconventional methods by non-state and state actors to counter stronger state opponents—terrorism, insurgency, civil war, etc.

The Air Force is currently engaged in these irregular challenges. C4ISR networks provide joint communications, imagery and signals collection, and intelligence analyses. Air Force Global Mobility allows the joint force to seize and hold initiatives through aerial refueling, deployment of Special Operation Forces, aeromedical evacuation, and intra-theater cargo airlift.

"Across Iraq, airlift operations are keeping 30 convoys a day (about 1,200 trucks a month) off the roads and out of harm's way."

In intense urban battles, the Air Force delivers deadly but accurate Rapid Strike in support of soldiers and Marines. AC-130 gunships and A-10 fighters lay down barrages of cannon and artillery fire, Predator unmanned aerial vehicles (UAVs) take out sniper nests with Hellfire missiles, and our "fast movers" and bombers drop all-weather GPS-guided bombs, suited to the urban environment because of their accuracy and limited blast radius. All of this is orchestrated with incredible skill by battlefield airmen, embedded with ground forces in the midst of the fight…and often in dangerously close proximity.

Across Iraq, airlift operations are keeping 30 convoys a day (about 1,200 trucks a month) off the roads and out of harm's way. In the future, the Air Force will nearly quadruple this airlift effort and move over 1,600 tons per day. Air Force aircraft also provide 70% of the airborne ISR, and jam the signals used to detonate the notorious improvised explosive devices (IEDs), which are often triggered by wireless doorbells or cheap cell phones.

In both Iraq and Afghanistan, Air Force aerial refueling enabled Air Force and Navy fighters and bombers to support Special Operations Forces on the ground. Such close air support has been a critical component of joint operations – in fact, Air Force controllers have called in over 80% of all air strikes in Operation ENDURING FREEDOM. The Air Force may not always have the host nation basing support they desire, so air refueling will play an even greater role in the future.

"In Iraq, the Air Force demonstrated the ability to strike a high-value target only 57 minutes after initial detection. In the future, the Air Force will do this in less than one minute."

Traditional challenges, posed largely by states, employ legacy and advanced military capabilities through military forces in long-established, well-known forms of military competition and conflict.

Air Force capabilities for traditional operations were showcased during Operation IRAQI FREEDOM in 2003. Persistent C4ISR allowed joint forces to cut through the fog of war with unprecedented situational awareness. Global Mobility allowed the Air Force to open nearly 40 bases in the Arabian Gulf, gave theater commanders the ability to deploy forces directly into northern Iraq, and enabled joint air power to support rapidly moving ground forces. Soldiers and Marines fighting their way to Baghdad were able to tap Rapid Strike capabilities through embedded battlefield airmen and strike targets through driving sandstorms.

At the foundation of this advantage is Network Centric Warfare: centralized command, control, and communications, wide-ranging awareness, and integrated joint action. Mobile warfare demands mobile communications, and in Iraqi Freedom alone, the Air Force used 24 times more satellite communications bandwidth than the first Gulf War just 12 years earlier. In Iraq, the Air Force demonstrated the ability to strike a high-value target only 57 minutes after initial detection. In the future, the Air Force will do this in less than one minute.

In order to continue accomplishing all of these missions, commanders must have control of the air and space. Gaining control of air and space provides the joint forces the required forcible entry necessary for follow-on operations. It provides the cover so that a constellation of C4ISR platforms can orbit over enemy territory, or American ground forces can deploy within that territory, or attack assets can strike deep into that territory. It protects naval forces in adjoining waters from air, sea, or land-based cruise missiles (especially of the low-observable variety).

New threats to air and space dominance continue to emerge. For instance, growing inventories of ballistic and cruise missiles pose a threat to deployed joint forces as much as they pose a threat to the homeland. U.S. forces need to neutralize these systems before they are launched or destroy them in flight. U.S. forces don't ever want to be in the position of the Taliban or the Iraqi leadership—harassed, confused, on the run, and unable to use a cell phone or radio for fear a joint direct attack munition (JDAM) would come crashing through the skylight.

"Persistent C4ISR capabilities provide secure, unbreakable communication links to the President, ensure advance warning of airborne threats, and track WMD and pre-cursor elements."

Catastrophic challenges involve the surreptitious acquisition, possession, and possible terrorist or rogue usage of weapons of WMD, or methods producing WMD-like effects.

Air Force capabilities also come together in direct response to catastrophic challenges. Persistent C4ISR capabilities provide secure, unbreakable communication links to the President, ensure advance warning of airborne threats, and track WMD and pre-cursor elements. The Air Force maintains ballistic missiles on alert and can quickly scramble bombers to deter an attack by a nation state. If actually attacked, Air Force systems would also provide characterization of the attack in order to coordinate a defense.

Global Mobility assets sustain persistent combat air patrol through aerial refueling, keep the President out of harm's way, and move troops and relief supplies rapidly when necessary. The Air Force's Rapid Strike furnishes super-cruise-capable F/A 22s for defense against missiles, Inter-Continental Ballistic Missiles for strategic deterrence, and long-range bombers to destroy WMD threats.

After any attack, Air Force assets would play an important role in consequence management—getting troops to the scene to restore order, evacuating casualties, bringing in rescue equipment, re-establishing communications, and supporting the civil authorities.

In addition, Air Force intelligence systems seek to locate dangerous weapons of mass destruction—and then track their movement. Once found, Air Force aircraft can move dangerous materials from insecure facilities – such as fissile materials from Kazakhstan, or nuclear-capable MiG-29s from Moldova. Alternately, the Air Force might strive to secure the weapons by inserting Special Operation Forces and supporting them with actionable intelligence gained through a variety of airborne and space sensors.

Disruptive challenges emanate from competitors developing, possessing, and employing breakthrough technological capabilities intended to supplant U.S. advantages in specific operational areas. In the increasingly interconnected, technology-dependent world, disruptive capabilities could emerge from commercial or military sectors.

Shadowy terror groups like Al Qaeda use the Internet as a global command and control network, an intelligence resource, and even a weapon, if turned against U.S. critical information infrastructure.

Key to defeating this challenge is the recognition the old threat paradigm, focused primarily on other states and especially the military force-on-force capabilities of known enemies, is necessary but no longer sufficient. Many of these new threats –especially those of radical fundamentalist terrorists not controlled by traditional states – will not be deterred by our overwhelming military superiority and will present challenges that do not lend themselves to "traditional" solutions.

"Air Force capabilities make the joint team the most disruptive military force on the planet."

Bolstering information operations and developing low-cost, near-space capabilities will ensure the Air Force's Persistent C4ISR remains responsive and effective to these challenges. Global Mobility assets ensure worldwide access by upgrading defensive systems on large aircraft to counter next generation portable missile threats. Rapid Strike will counter missiles and aircraft with advances such as a 90 percent low-observable fighter force, missile defense capabilities of the F/A 22, laser counters to ballistic missiles, and UAVs. This is where the Air Force focus on technology really pays off for the nation.

Fortunately, Air Force capabilities make the joint team the most disruptive military force on the planet. The Air Force is a high tech service with an unrivaled research and development base. Investments in battlelabs and basic research laboratories are dedicated to searching for new ideas and technology. These investments bolster the Air Force's ability to quickly react to disruptive changes in technology and tactics.

Balancing Future Requirements and Fiscal Constraints

Wartime expenses aside, the big spending increases of recent years seem unlikely to be repeated far into the future. Persistent federal deficits and growing domestic entitlement programs will constrain the amount of money that can be spent on military preparedness. The defense budget may level off just as it should rise to accommodate high operating costs and mounting requirements for military transformation. If so, budget constraints will compel a concerted effort to spend available defense funds as wisely as possible. Spending patterns and priorities will change, and tradeoffs will be necessary. If pressures on the defense budget increase, the biggest challenge facing the Department of Defense (DOD) will be determining how best to pursue two key transformation goals. As Air Force strategists shape the Air Force of tomorrow, they must plan with these constraints in mind.

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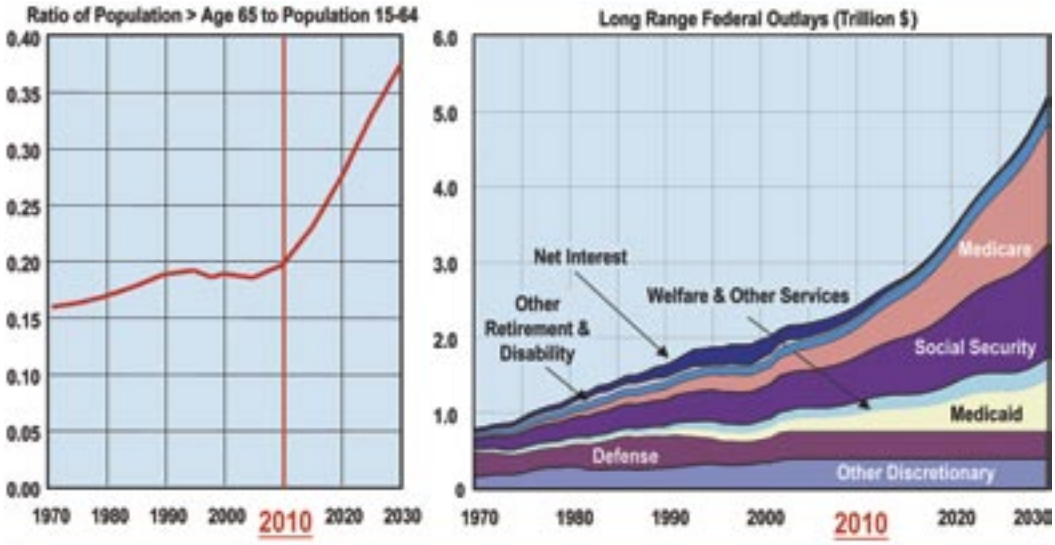


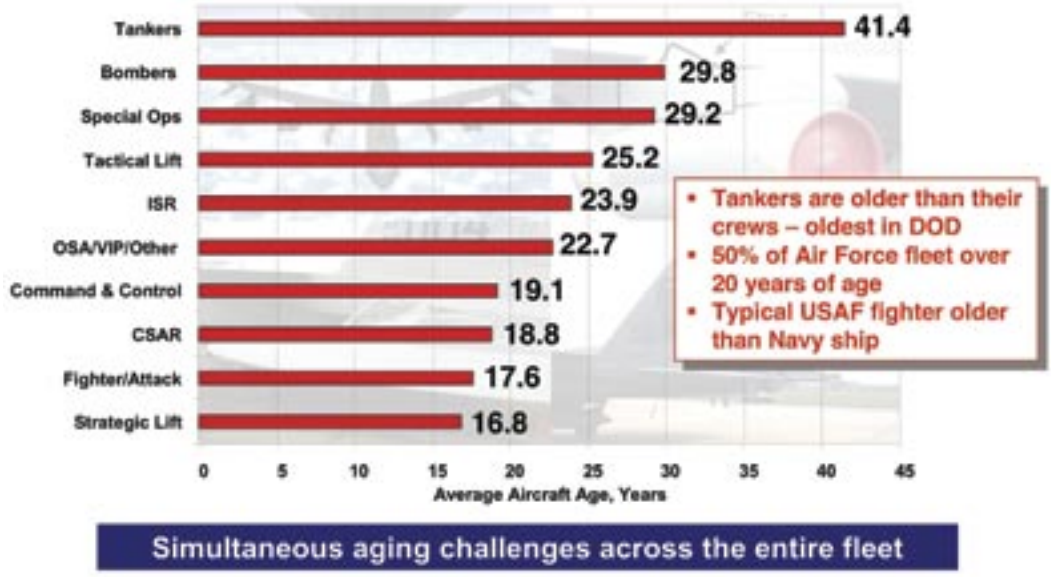
Demand for Social Security, Medicare, Medicaid may limit Defense outlays after 2010

As Air Force strategists shape the Air Force of tomorrow, they must plan within significant budgetary constraints. Between 2010 and 2030, close to 30 million baby boomers will retire, while only 10 million new wage earners will enter the workforce. Taken together, this will create a fiscal environment where defense and other discretionary budgets will face zero, or negative, real growth.

"The nation's need for Persistent C4ISR, Global Mobility, and Rapid Strike will not decrease."

The Air Force must also consider modernization needs in almost every mission area. Air Force tankers, bombers, ballistic missiles, and many surveillance aircraft are older than their crews. The oldest aircraft in inventory is the KC-135 tanker, which now averages over 44 years of age. In addition, the U.S. has fought four wars in 15 years, which has eaten up a lot of airframe life. Spread across the rest of the fleet, the Air Force faces an almost simultaneous recapitalization of the entire force over the next two decades. (Navy source: Navy Visibility and Management of Operating and Support Costs [VAMSOC]).

USAF Resource Allocation: Five Decades of Shaping the Future as of Feb 05



The nation's need for Persistent C4ISR, Global Mobility, and Rapid Strike will not decrease. The irregular, traditional, catastrophic, and disruptive challenges of the future will require significant contributions from the entire joint force and the Air Force will be expected to perform a greater number of missions with diminishing resources. To solve this dilemma, Air Force planners developed the Future Total Force.

The Future Total Force

To build necessary capabilities with limited resources, the Air Force has spent the past two years developing a Future Total Force (FTF) concept that projects a 2025 Force Structure and provides a "beacon" to the future.

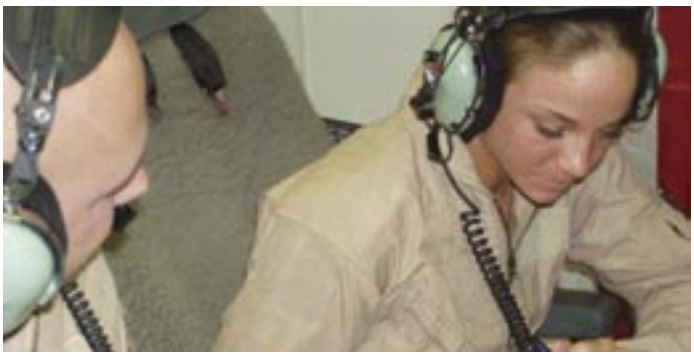
To increase combat effectiveness, the FTF force structure will maximize Air Force capability with minimum manpower by focusing efforts on Special Forces, long-range strike, and UAVs as a complement to current tactical air capabilities. **By 2025, the Air Force will have 10 percent fewer aircraft overall, including 25 percent fewer fighter aircraft.** However, increased crew ratios, reliability of aircraft, precision weapons, and stealth will improve future capability.

"The Air Force is pushing the envelope to integrate its active, Guard, and Reserve components"

To increase peacetime efficiency, the FTF organization integrates all three Air Force components—the Air National Guard, the Air Force Reserve, and the active duty force. In the past, integration of active and Guard components have facilitated rapid and effective "new mission" capability with the Joint Surveillance Target Attack Radar System (JSTARS) at Robins Air Force Base. Today, the Guard and Reserve contribute 53% of strategic airlift crews, 65% of theater airlift crews, and 62% of tanker crews. The future will bring more integration as active and Guard units become full partners to jointly transition to and operate the F/A 22 – the world's most advanced fighter aircraft.

By exploring these and other test case initiatives, the Air Force is pushing aggressively for integration of its active, Guard, and Reserve components—it is an absolute prerequisite for affordable modernization.

The Air Force has long been on the cutting edge of integrating the active and Reserve Components into a single, "Total Force." As demonstrated, the active portion of the Total Force has been drawn down over time and the Air National Guard and Air Force Reserve now comprise one-third of the Total Force. The proper balance of the three components is the key to the Future Total Force.

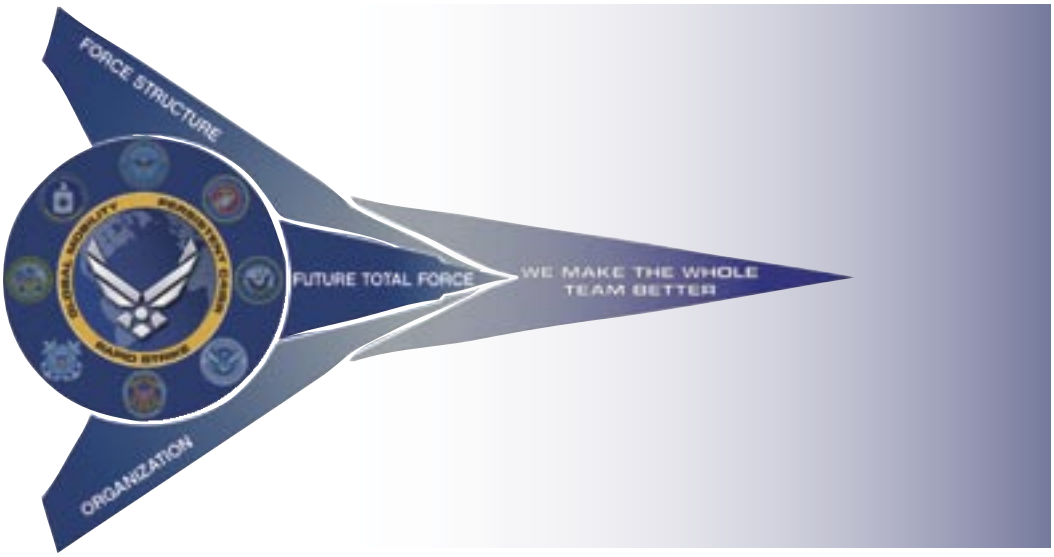


This force structure plan balances competing modernization requirements with realistic fiscal constraints. To do that, the Air Force will reduce the size of the overall force through aggressive divestment of legacy platforms while improving future capability. The current Air Force plan includes a fighter force that is 25% smaller – part of an overall force that is about 10% smaller. That 25% is the equivalent of the Navy downsizing by three aircraft carriers or over two divisions in the Army.

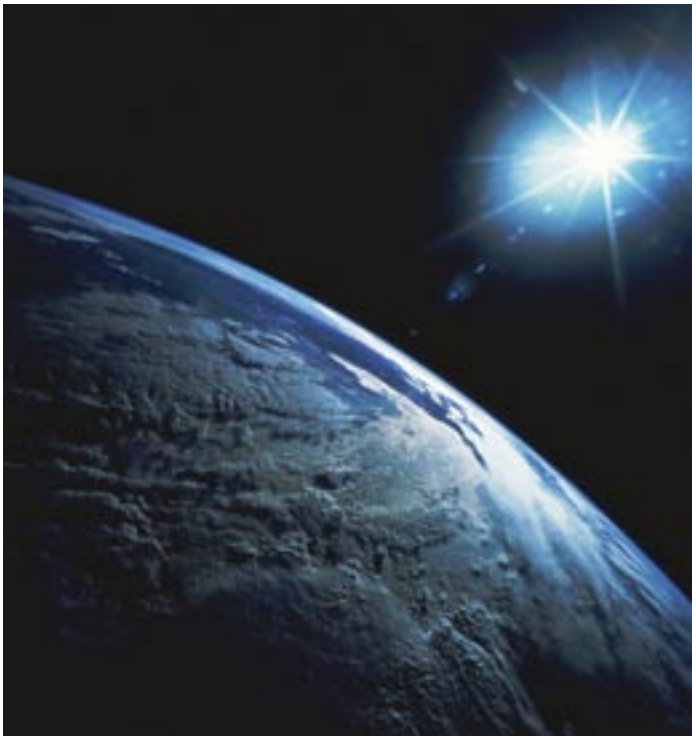
"The Air Force is also planning to increase investment in joint enablers."

The Air Force is also planning **to increase investment in joint enablers.** For example, the Air Force will increase the number of crews per aircraft to extract more capability. A resource such as this does not benefit any of the services by sitting around due to lack of crews.

The overall goal of the Future Total Force (FTF) is to increase combat effectiveness and peacetime efficiency. Precision weapons, stealth, and improved reliability will allow the Air Force to reduce in size and still get the job done.



"The Air Force has successfully transformed in the past and will continue improving its unique capabilities to make joint force operations successful in the future."



The U.S. Air Force Journey

The U.S. Air Force has a unique cultural competency that has enabled it to adapt to the demands of a changing world. History has shown airmen have a culture of innovation and a willingness to embrace technology and change. The development and integration of precision weapons have revolutionized warfare—with a single weapon the Air Force can now accomplish objectives that required more than 1,000 aircraft during World War II.

This leap in capability is not limited to Rapid Strike. Nearly 50 years ago, the Berlin Airlift required 225 aircraft to deliver cargo from Rhein-Main Air Base, just 220 miles away. Today, 185 C-17s could fly the same quantity of cargo from Dover Air Force Base in Delaware to Berlin—16 times farther with 40 fewer aircraft.

Compared to Operation DESERT STORM, Operation IRAQI FREEDOM used half the force in half the time, with one-tenth the number of munitions, to achieve more ambitious goals.

Air Force history is filled with such examples. The Air Force has successfully transformed in the past and will continue improving its unique capabilities to make joint force operations successful in the future.

"The Air Force is prepared to face the challenges of today and the uncertainties of tomorrow."

Conclusion

As the nation contemplates future challenges, the Air Force is focusing on increasing its joint enabling capabilities to ensure the continued dominance of the joint force. In this role, the Air Force believes that the importance and existence of joint air and space dominance cannot be assumed. It is the key enabler for joint operations.

Persistent C4ISR, Global Mobility, and Rapid Strike provide critical capabilities to any joint operation, whether a counter-insurgency operation in Iraq and Afghanistan; a traditional combat operation against a peer competitor; or protection of the homeland against catastrophic attacks. The capabilities the Air Force provides to the nation are absolutely crucial.

As the Air Force integrates a new FTF force structure and organization, its combat capability and peacetime efficiency will increase. In turn, this will increase the overall capability of the entire joint team. By enhancing Persistent C4ISR, Global Mobility, and Rapid Strike capabilities through the Future Total Force, the Air Force is prepared to face the challenges of today and the uncertainties of tomorrow.

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